PATIENT EDUCATION | *INFORMATION SERIES*

What is Nontuberculous Mycobacteria (NTM) Lung Disease?

NTM are bacteria that are normally present in the environment. Inhalation of these bacteria may cause disease in both healthy patients and those with compromised immune systems. NTM disease most often affects the lungs in adults (NTM lung disease), but it may also affect any other organs in the body. Person-to-person transmission of NTM disease usually does not happen, in contrast to transmission of tuberculosis (*Mycobacteria tuberculosis*), which is common.

The number of people with NTM lung disease is increasing worldwide. (For more information on tuberculosis, see ATS Patient information series at www.thoracic.org/patients)

What causes NTM lung disease?

NTM comprise more than 190 different species (types) of bacteria that are found naturally in the environment. The existing species of NTM can vary from place to place in the world. The most common species causing lung disease is called *Mycobacterium avium complex* group. The next most common are *Mycobacterium abscessus complex* and *Mycobacterium kansasii*. Everyone inhales NTM into the lungs; however, only a very small number of people develop NTM lung disease.

Who gets NTM lung disease?

Some people are at higher risk of getting an NTM lung infection and developing lung disease. People who have an existing lung disease such as bronchiectasis (enlargement of airways), chronic obstructive pulmonary disease (COPD), cystic fibrosis, alpha-1 antitrypsin deficiency or who have had prior lung infections such as tuberculosis are at increased risk of NTM lung disease. Patients with advanced HIV infection (CD4 <50) or immune-related genetic disorders such as (interferon-gamma deficiency or receptor deficiency, interleukin-12 deficiency) may develop pulmonary disease as part of a disseminated NTM (widespread in the body) infection.

What are the signs and symptoms of NTM lung disease?

NTM causes symptoms similar to a chronic and non-resolving pneumonia. Common symptoms include:

- cough with sputum production,
- tiredness (fatigue),
- fever,
- coughing up blood (hemoptysis)—a late sign of illness,
- shortness of breath,
- unplanned weight loss.

(For more information on pneumonia, see the ATS Patient information series at www.thoracic.org/patients)

How is NTM disease diagnosed?

It is difficult to distinguish who is simply carrying NTM bacteria and is not ill from it, (which we called colonized) from those with true NTM lung disease.

Therefore, the diagnosis depends on:

(1) tests to show the presence of NTM bacteria

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AND; (2) a clinical judgment based on a person's symptoms and additional tests showing evidence of active disease.

Sputum (mucus) is looked at under the microscope to see if NTM bacteria are present. Cultures to try to grow the bacteria are also done. Some NTM grow rapidly in culture—within a few days—but some NTM types take several weeks to be detected in the culture. Collection of three early-morning sputum samples on different days is preferred for diagnosis of NTM lung disease. Bronchoscopy is sometimes needed to obtain lung samples. (See ATS Patient Information Series 'Flexible Bronchoscopy' at www.thoracic.org/patients.) If other parts of the body are affected, fluid sampling or tissue biopsy may be needed. Your healthcare provider will order other tests including chest imaging such as a plain X-ray and a high-resolution CT scan.

Your healthcare provider will discuss which tests are best for you and what the results show. Repeat sputum cultures are typically done during treatment to measure its success.

How is NTM disease treated?

Treatment and outcomes depend on which NTM species is causing disease. A decision to treat NTM disease is often based on symptoms, microbiological culture data and other test results. Typically NTM lung disease is treated with three or more antibiotics until sputum cultures have been negative for 12-18 months. Commonly used antibiotics include macrolides, ethambutol, rifamycins, aminoglycosides, fluoroquinolones, imipenem and linezolid. Treatment may be complicated by potential toxicity or side-effects with the use of these antibiotics. Treatment is usually done by a lung or infectious disease specialist who has experience treating NTM infection. Therefore, you will require close follow up during treatment. Other therapies may also be used, such as airway clearance.

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℞ *Action Plan*

✔ Seek medical attention if you have symptoms of pneumonia such as cough, fever and fatigue that do not resolve within two weeks.

✔ Talk with your healthcare provider if your respiratory symptoms do not get better as expected with treatment for pneumonia or if you cough up blood.

✔ Take all medications and antibiotics as prescribed.

✔ Avoid use and exposure to tobacco products.

✔ Get immunizations including flu, pneumonia, COVID-19 as recommended by your healthcare provider.

Healthcare Provider's Contact Number:

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Resources:

American Lung Association
https://www.lung.org/lung-health-diseases/lung-disease-lookup/nontuberculous-mycobacteria

COPD Foundation
www.copdfoundation.org

Bronchiectasis and NTM Initiative
www.BronchiectasisandNTMInitiative.org

National Institutes of Health (Medline Plus)
https://medlineplus.gov/mycobacterialinfections.html

American Thoracic Society
https://www.thoracic.org/patients (patient materials)

https://www.thoracic.org/statements/guideline-implementation-tools/treatment-of-ntm.php (clinician materials)

CHEST Foundation
https://foundation.chestnet.org/lung-health-a-z/nontuberculous-mycobacteria-ntm/

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